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Operative management of benign nonepithelial solid laryngeal tumors

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Most benign tumors of the larynx are epithelial in origin, with nearly 85% being laryngeal papilloma. Nonepithelial laryngeal tumors are uncommon and more than 50% of these are malignant. Therefore, benign nonepithelial solid tumors of the larynx are quite rare. The management of these tumors varies based on the site of origin, specific pathology, tumor size, and risk for malignant transformation. Most are ultimately treated with complete surgical excision, although the potential response of the tumor to adjuvant therapy may play a role in decision making. In this article, general approaches to surgical excision of these benign nonepithelial laryngeal tumors is discussed.

Introduction

The majority of benign laryngeal neoplasms are derived from an epithelial origin. By far, the most common benign laryngeal neoplasm is papilloma, typically in the setting of recurrent respiratory papillomatosis. Nonepithelial laryngeal neoplasms have an extensive differential diagnosis. This discussion is limited to selected benign mesenchymal solid tumors that are nonvascular, including granular cell tumors, lipomas, neurofibromas, and schwannomas. Most of these laryngeal pathologies are treated with complete surgical excision. However, the surgical approaches to these tumors vary based on the site of origin, size, specific pathology, and risk for malignant transformation.[1] In some cases, the decision to pursue nonsurgical treatment can be based on the response of these tumors to adjuvant therapy. A brief discussion of these pathologies will be followed by a discussion on transoral approaches for surgical excision. Larger lesions may dictate an open/external approach which is not discussed here.

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Pathologies

Granular cell tumors are the most commonly occurring of this category. They are thought to have a neurogenic origin, from either undifferentiated mesenchymal cells or Schwann cells.[2] While this type of tumor is common in the head and neck, endolaryngeal tumors represent only 7%-10% of all head and neck granular cell tumors.[2,3] About 50% of these occur at the level of the glottis, in and around the true vocal cords. The remainder may occur in the subglottis, and less commonly, the supraglottis. They are typically small (<2 cm), firm, well circumscribed, and submucosal (Figure 1).[2] Frequently, there is an overlying layer of pseudoepitheliomatous hyperplasia which can lead to misdiagnosis as an epithelial lesion, or even squamous cell carcinoma, when a superficial biopsy is taken.[3] Granular cell tumors are largely radioresistant and the treatment

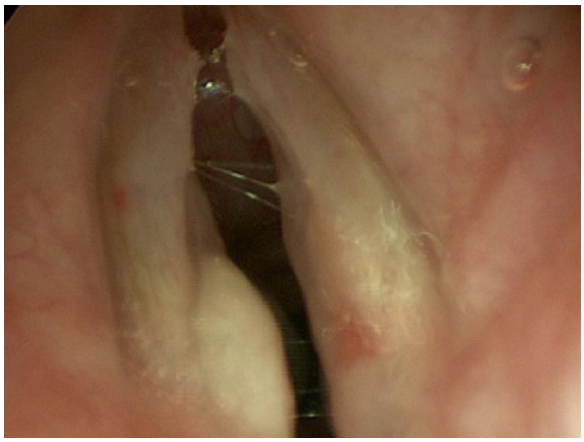

Figure 1 Granular cell tumor of the left posterior glottis and arytenoid. Open access, creative commons license (http://creativecommons.org/licenses/by/4.0/).

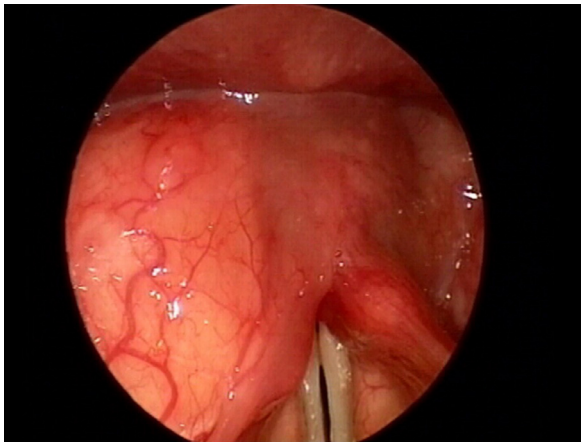

Figure 2 Endoscopic view of a right supraglottic submucosal lipoma. Used with permission from Elsevier.

of choice is complete local excision. Recurrence rates are around 2%-8%.[2]

Lipomas of the larynx represent about 0.6% of benign laryngeal tumors. They arise from adipose cells within the subepithelial layer. There is a paucity of subepithelial fat in the glottis and subglottis, and therefore laryngeal lipomas arise almost exclusively from the supraglottis.[5] They appear as smooth well-defined submucosal tumors (Figure 2).[4] On gross appearance alone, lipomas can be difficult to distinguish from well-differentiated liposarcomas and biopsy is needed to make a definitive diagnosis. For obstructive lesions, complete local excision is the treatment of choice.

Laryngeal neurofibromas and schwannomas (Figure 3) are rare benign tumors of neurogenic origin. They each represent approximately 0.1% of all benign laryngeal tumors.[6-8,10] As indicated by their name, schwannomas arise from perineural Schwann cells, but neurofibromas arise from fibrocytes intertwined within the neural fascicle.[8] Both types of tumors tend to occur in the supraglottis, with the AE folds and arytenoids being the most common subsites, presumably due to the density of terminal nerve

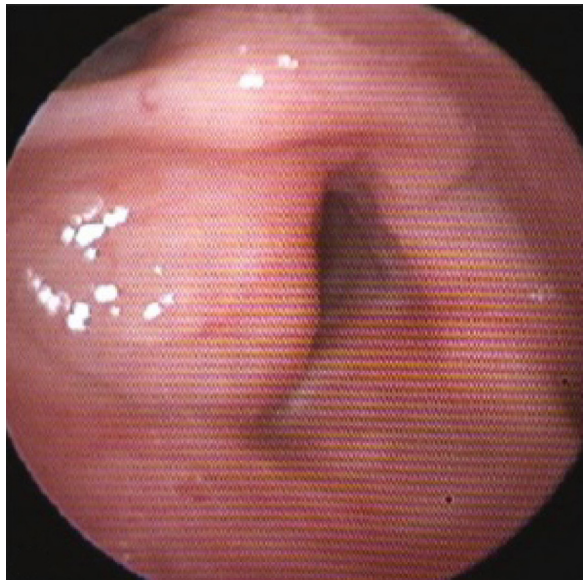

Figure 3 Right supraglottic laryngeal schwannoma. Open access, creative commons waiver (http://creativecommons.org/publicdomain/zero/1.0).

plexuses.[6-8,11] On endoscopic exam, they are indistinguishable from other benign submucosal tumors. Schwannomas can be treated with partial or complete excision in the case of obstruction. They are fairly radioresistant. There is no risk for malignant transformation and recurrence is rare even if a portion of the capsule is left behind.[9] Neurofibromas, on the other hand, have a 5%-10% incidence of sarcomatous malignant degeneration.[8,11] They can be more challenging to remove completely due to their infiltrative nature, especially the plexiform subtype. In some cases, subtotal excision with close observation can be performed.[11] Ablation of residual tumor with CO_2 laser following excision has also been proposed.[10]

Other, exceedingly rare, benign laryngeal neoplasms include chondromas, oncocytomas, osteomas, and rhabdomyomas. Only isolated cases are reported about these laryngeal pathologies and therefore management would likely be on a case-by-case basis.

Transoral approaches for supraglottic tumors

Most benign laryngeal tumors are small and can be removed transorally using microlaryngeal instruments. Once the patient is brought to the operating room and placed under general anesthesia, intubation is performed using the smallest possible laser-safe endotracheal tube to allow maximal exposure. A dental guard should be utilized. A laryngoscope, such as the Lindholm, with a wide viewing angle is placed and suspended. With good visualization of the tumor using a high-power binocular microscope, the mucosa overlying the tumor is incised using either a laryngeal microknife or CO_2 laser. Prior to this, some local anesthetic with epinephrine can be injected in a submu-

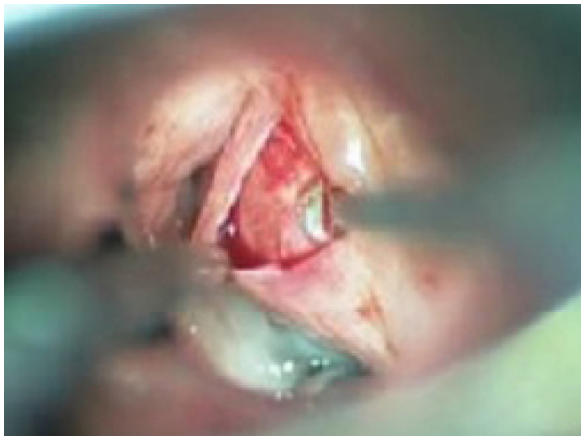

Figure 4 Extracapsular dissection of right supraglottic schwannoma.

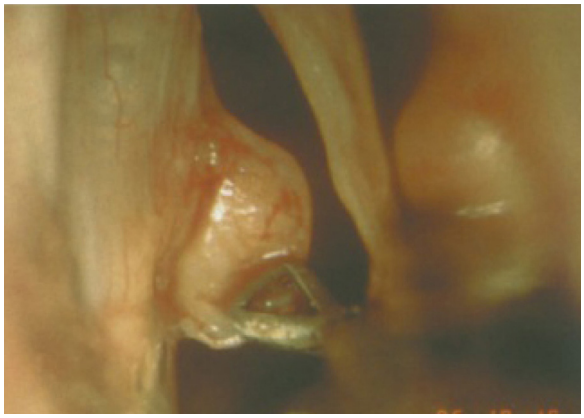

Figure 5 Left true vocal cord granular cell tumor.

cosal plane to ensure hemostasis and perform tissue hydrodissection.

A mucosal flap is then elevated over the lesion using a blunt elevator dissecting in a submucosal plane. In the case of well-circumscribed neoplasms, such as schwannomas and lipomas, this submucosal extracapsular plane of dissection is carried circumferentially around the tumor to excise it completely (Figure 4).

For neurofibromas, it can be challenging to separate the tumor from the nerve from which it arises. In this case, a subtotal resection may need to be performed. Once the tumor has been removed, any redundant mucosa may need to be excised. The mucosal edges can then be laid down to heal secondarily or, depending on the size of the flap, a few sutures may need to be placed.[12,13]

Approaches for glottic tumors

Benign glottic tumors, such as granular cell tumor (Figure 5), can also be approached transorally. Here, a microflap technique similar to microflaps used in the removal of vocal cord cysts, nodules, and polyps can be utilized. Once the patient is in the operating room and intubated with a small laser-safe tube, a laryngoscope that optimizes the view of the true vocal cord lesion is placed and suspended. A high-power microscope is used for binocular visualization of the tumor and to allow both hands to work. Saline or epinephrine is injected at the base of the lesion for hydrodissection and hemostasis. Next, a mucosal incision is made using a microknife or CO_2 laser just lateral to the lesion. A micro mucosal flap is raised over the tumor using a small curved elevator. The tumor is then removed using sharp dissection or CO_2 laser dissection around the tumor. The microflap is then repositioned over the defect.

External approaches

In the case of supraglottic or transglottic tumors that are larger than a few centimeters, open approaches to the larynx may be necessary. Lateral thyrotomy, lateral pharyngotomy, laryngofissure, transhyoid pharyngotomy, and extralaryngeal techniques have been utilized for tumor removal.[8] The decision to proceed with any of these open approaches is made on a case by case basis, as determined by the size, pathology, subsite, and risk for malignant transformation. Open approaches can provide better access and visualization for larger tumors, but carry the potential for increased morbidity.

Conclusion

Benign nonepithelial tumors of the larynx, such as granular cell tumors, schwannomas, lipomas, and neurofibromas, are rarely encountered. Complete excision is the management of choice for the majority of these neoplasms and most can be excised utilizing transoral microsurgical techniques which are described here. Larger lesions may necessitate an open approach to facilitate exposure and resection.

Disclosure

The author report no proprietary or commercial interest in any product mentioned or concept discussed in this article.

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